Psychopharmacology and PTSD 2
Written Video Transcript

Moving on to the basics of neurochemical communication. So, this diagram here just shows an interaction between neurons taken from the textbook by (Cooper Blumenroth), showing a set of nerve cells communicating with one another. The biggest one that you see there starts with a cell body, [00:00.20.00] the axon, the terminal at the end with the T coming out which is the chemical transmitter that's released from the one neuron travels across the synapse to interact with the next neuron in line and thereby send a signal. That's shown a little bit more in this diagram, [00:00.40.00] this is from a web site by Dr. (Chudler). This shows the axon, the axon terminal like you saw before. The little red dots are the neurotransmitters being released upon arrival of a electrical stimulus and bonding to the next cell, the (postsynaptic) cell in line. [00:01.00.00] The electron micrograph next to it just shows actually physically what this actually looks like with that black area in between those two cells being the synapse. It's at this level that many of our pharmacological agents work at by interfering with this process of neurochemical communication. The neurotransmitters can be [00:01.20.00] divided into various groupings. The first set up on top are what are called the (biogenic amine) neurotransmitters. These were the first neurotransmitters to be identified back in 1910s, 1920s and identified to be transmitters in the brain in the 1960s. Then we found out [00:01.40.00] that our antidepressants seemed to work by interacting with these neurotransmitters, so a lot of excitement. We know a lot about how these neurons work. We know they're involved in stress. They're involved in sleep and mood and are the target of many of our current agents that we have. The next two neurotransmitters that you see there GABA and (glutamate) [00:02.00.00] are what are known as amino acid transmitters. As the name would imply they're derived from amino acids, one of the basic building blocks of proteins. The one on top, GABA has an inhibitory or a shutting down effect on the next cell in line, whereas (glutamate) has a stimulatory affect. These [00:02.20.00] neurotransmitters are in the majority of synapses in the brain and they probably function mainly as the on and off signaling at most synapses. The third class of transmitters that you see down there are what are known as neuropeptides. These are kind of the future. [00:02.40.00] A lot of interest is currently focused on trying to develop agents that may be effective of interacting with these. They're interesting in the fact they're often co-localized with these other neurotransmitters, meaning they're in the same cell and released at the same time. They have some interesting effects. CRF has been linked [00:03.00.00] with anxiety in rat models. If you give CRF, a rat looks anxious. If you give a blocker, it looks less anxious. Based on that there's been millions of dollars pouring in to trying to get an antagonist that works in humans. To my knowledge it hasn't been done yet because it's difficult to get across [00:03.20.00] into the brain. But anyway a lot of future pharmacology will probably come out of this class of neurotransmitters. Any questions about that? So, the question is whether or not these neurotransmitters are only in specific set of nerves [00:03.40.00] or does—one nerve can

have you know a couple of different types of neurotransmitters. And it's the latter. I mean there's nerve cells that can have both dopamine, GABA and neuropeptide Y all in the same terminal. So, we're all trying to figure—still trying to figure out what that means. But [00:04.00.00] that seems to be more the norm than the exception. Any other questions?

[end of audio]